**IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE**

3SHAPE A/S,	)	
	)	
Plaintiff,	)	C.A. No. To be Assigned
v.	)	
	)	JURY TRIAL DEMANDED
ALIGN TECHNOLOGY, INC.,	)	
	)	
Defendant.	)	

COMPLAINT FOR PATENT INFRINGEMENT

Plaintiff 3Shape A/S ("Plaintiff" or "3Shape"), by and through its undersigned counsel,

for its complaint against Defendant Align Technology, Inc. ("Defendant" or "Align"), hereby

alleges and states the following:

PARTIES

1.   Plaintiff 3Shape is a Danish corporation with a principal place of business at

Holmens Kanal 7, 1060 Copenhagen K, Denmark.

2.   Plaintiff is the owner by assignment of the entire right, title and interest in and to

U.S. Patent No. 9,629,551 ("the '551 patent") entitled, "Detection of a Movable Object When 3D

Scanning a Rigid Object," a copy of which is attached hereto as Exhibit A.

3.   Plaintiff sells an industry-leading intraoral scanner under the name TRIOS®.

4.   The TRIOS® system incorporates embodiments of the patented technologies of

the '551 patent.

5.   Defendant is a competitor of Plaintiff in the field of intraoral scanners.

6.   Upon information and belief, Defendant is a United States corporation organized and existing under the laws of Delaware, with a principal place of business at 2820 Orchard Parkway, San Jose, California 95134.

7.   Upon information and belief, Defendant makes, uses, sells and offers for sale in the United States and/or imports into the United States a product called "iTero Element Scanner" which comprises a handheld intraoral 3D scanner/wand.

JURISDICTION AND VENUE

8.   This is an action for patent infringement arising under the patent laws of the United States, Title 35, United States Code, § 100 *et seq*.

9.   This Court has subject matter jurisdiction over this action pursuant to 28 U.S.C. §§ 1331 and 1338(a).

10.   This Court has personal jurisdiction over Defendant because it has, directly or through its agents and/or intermediaries, committed acts within Delaware giving rise to this action and/or Defendant has established minimum contacts with Delaware such that the exercise of jurisdiction would not offend traditional notions of fair play and substantial justice.

11.   Upon information and belief, Defendant regularly conducts business in Delaware, and purposefully avails itself of the privileges of conducting business in Delaware. In particular, upon information and belief, Defendant and/or its agents and/or intermediaries, make, use, import, offer for sale, sell and/or advertise their products and affiliated services in Delaware, including the iTero Element Scanner, sufficient to give rise to jurisdiction.

12.   Defendant has also purposely availed itself of the courts of this venue, having brought actions against Plaintiff in the federal courts of the District of Delaware, including the

pending 17-cv-1646, -1647, -1648, and -1649 actions. The use of the courts of this jurisdiction is sufficient to give rise to jurisdiction over Defendant.

13.   Upon information and belief, and as further described herein, Defendant has infringed and continues to infringe and/or contributorily infringe the '551 patent in Delaware, which has led to foreseeable harm and injury to Plaintiff. Upon information and belief, Defendant derives substantial revenue from the sale of infringing products distributed within Delaware and/or expects or should reasonably expect its actions to have consequences in Delaware.   In addition, upon information and belief, Defendant knowingly induces, and continues to knowingly induce, infringement of the '551 patent within Delaware by offering for sale, selling, and/or contracting with others to market infringing products with the intent to facilitate infringing use of the products by others within Delaware and by creating and/or disseminating product information and other materials providing instruction for infringing use.

14.   Venue is proper in this District pursuant to 28 U.S.C. § 1391(b), (c) and/or (d), and 28 U.S.C. § 1400(b).

COUNT 1: DIRECT INFRINGEMENT OF THE '551 PATENT

15.   Plaintiff incorporates by reference the preceding paragraphs as if set forth fully herein.

16.   This cause of action arises under the patent laws of the United States, and in particular, 35 U.S.C. §§ 271, *et seq.*

17.   The '551 patent was duly and lawfully issued by the United States Patent and Trademark Office ("USPTO") on April 25, 2017, to listed inventors Rune Fisker, Michael Vinther, and Henrik Öjelund.

18.   Plaintiff is the owner by assignment of all right, title and interest in and to the

'551 patent. Evidence of the assignment of the '551 patent to Plaintiff is recorded with the USPTO at Reel/Frame 043981/0005. Plaintiff is listed on the face of the '551 patent as assignee.

19.   The '551 patent is entitled, "Detection of a Movable Object When 3D Scanning a Rigid Object."

20.   The '551 patent is directed to the detection of a movable object in a location, when scanning a rigid object in the location by means of a 3D scanner for generating a virtual 3D model of the rigid object.

21.   Defendant makes, uses, offers to sell, sells, imports, promotes and/or demonstrates versions of its iTero Element Scanner, including the wand, cart, and/or related software, and other related products ("Accused Products") in the United States.

22.   Defendant possesses knowledge of, and is aware of, the '551 patent.

23.   Defendant had previously unsuccessfully challenged the patentability of claims 1-25 of the '551 patent in *inter partes* review (IPR) proceedings IPR2018-00195 and IPR2018-00196 before the USPTO.

24.   A panel of Administrative Patent Judges at the Patent Trial and Appeals Board of the USPTO determined that Defendant's IPR Petitions did not present a *prima facie* case for the unpatentability of the claims of the '551 patent and that trial should not be instituted in connection with either Petition.

25.   Defendant has been and is now directly infringing, literally and/or under the doctrine of equivalents at least claims 1, 22, 23, and 25 of the '551 patent.

26.   Each of Defendant's Accused Products includes a system and/or a method for [1] detecting a movable object in a location, when [2] scanning a rigid object in the location by means of [3] a 3D scanner for [4] generating a virtual 3D model of the rigid object.

27.   Defendant's Accused Products detect movable objects in a location.

28.   For example, Defendant's Accused Products "eliminate extra process steps during intraoral scanning because iTero Element is designed to automate those for you." *See, e.g.,* 2015 Align Technology, Inc. Brochure For General Practitioners M20324 Rev. A ("Brochure") at 4, attached hereto as Exhibit B and entitled, "iTero® element™ PRECISION."   Defendant's Brochure further states that "while you are scanning, iTero Element is engineered to simultaneously process the scan. It automatically stitches together images for rendering in the correct order, adapts to changes in positioning, and ***detects and removes soft tissues*** [*i.e.,* movable objects]. Capture everything. And view exactly what you need to see." *Id* (emphasis added).

29.   Defendant's Accused Products scan rigid objects in the location.

30.   For example, Defendant's Accused Products make use of color scanning "to immediately distinguish between gingival and tooth structures [*i.e.,* rigid objects] …." *See* Brochure at 4.

31.   Defendant's Accused Products make use of a 3D scanner.

32.   For example, Defendant's Accused Products include "[t]he iTero Element Intraoral Scanner … designed to deliver speed, reliability, intuitive operations, and outstanding visualization capabilities." *See e.g.,* Brochure at 3. Further, Defendant's Accused Products include "[i]ndustry-leading, open-choice imaging [that] lets you view images in 3D." *Id.* Furthermore, Defendant's Accused Products include "[i]ntegrated gyro technology [that] lets you rotate models on screen." *Id.* Defendant's Accused Products allows users to "[s]pin, pinch zoom and process images with a touch." *Id.*

33.   Defendant's Accused Products generate virtual 3D models of rigid objects in the

location.

34.   For example, Defendant's Accused Products' "[i]ndustry-leading, open-choice imaging lets you view images in 3D." *Id.*

35.   Upon information and belief, each of Defendant's Accused Products makes use of a method, wherein the method comprises: [4] providing a first 3D representation of at least part of a surface by scanning at least part of the location; [5] providing a second 3D representation of at least part of the surface by scanning at least part of the location; [6] determining for the first 3D representation a first excluded volume in space where no surface can be present in both the first 3D representation and the second 3D representation, and/or determining for the second 3D representation a second excluded volume in space where no surface can be present in both the first 3D representation and the second 3D representation; [7] if a portion of the surface in the first 3D representation is located in space in the second excluded volume, the portion of the surface in the first 3D representation is disregarded in the generation of the virtual 3D model; and/or if a portion of the surface in the second 3D representation is located in space in the first excluded volume, the portion of the surface in the second 3D representation is disregarded in the generation of the virtual 3D model.

36.   Defendant's Accused Products provide multiple (*i.e.,* first and second) overlapping 3D representations of a part of a surface in a short amount of time.

37.   For example, Defendant's Accused Products are "engineered to capture 6,000 frames per second." *See* Brochure at 3. "With a scan capture time of 40-50 milliseconds, iTero Element is designed to capture 20 scans per second." *Id*.

38.   Further, two or more overlapping 3D representations of a part of a surface are required for Defendant's Accused Products to "stitch[] together images for rendering in the

correct order." *Id*. at 4.

39.   Defendant's Accused Products determine for each 3D representation an excluded volume in space where no space can be present in both a first 3D representation and a second 3D representation.

40.   Each of Defendant's Accused Products rely on parallel confocal sampling, a type of digital scanning technology available to the dental scanning industry that would necessarily calculate excluded volume data which is defined by at least the distances from the scanner to the tooth surface for each successive overlapping scan. *See, e.g.,* Brochure at 2; *see also* '551 patent at 28:9-16.

41.   Upon information and belief, Defendant's Accused Products provide successive scans that include substantially the same location/space because each of the iTero Element Scanners have "a scan capture time of 40-50 milliseconds [and] is designed to capture 20 scans per second." *Id*. at 3.

42.   Defendant's Accused Products disregard portions of the surface in a first 3D representation that is located in the space of a second excluded volume in the generation of the virtual 3D model and/or disregard portions of the surface in a second 3D representation that are located in the space of a first excluded volume in the generation of a virtual 3D model

43.   For example, Defendant's Accused Products were known to detect and remove soft tissue [*i.e.,* movable objects] by disregarding portions of the surface in a first 3D representation that were located in the space in a second excluded volume in the generation of the virtual 3D model and/or by disregarding portions of the surface in a second 3D representation that were located in the space in a first excluded volume in the generation of the virtual 3D model. *See* Brochure at 4.

44.   Additionally,   a   Gardner   Orthodontics   Video   ("Video   1")   found   at

https://www.youtube.com/watch?v=bxZzzJvB4OM and published on December 29, 2016 (last

visited June 3, 2018), attached hereto as Exhibit C, depicts Defendant's Accused Products

scanning teeth (*e.g.,* a rigid object) in a location (*e.g.*, patient's mouth) by means of a 3D scanner

and generating a virtual 3D model of the rigid object.

45.   At time 1:50 [min:sec] of Video 1, a movable object (*i.e.,* lip) is detected on the

labial side of the patient's anterior teeth by Defendant's Accused Products, as depicted below.
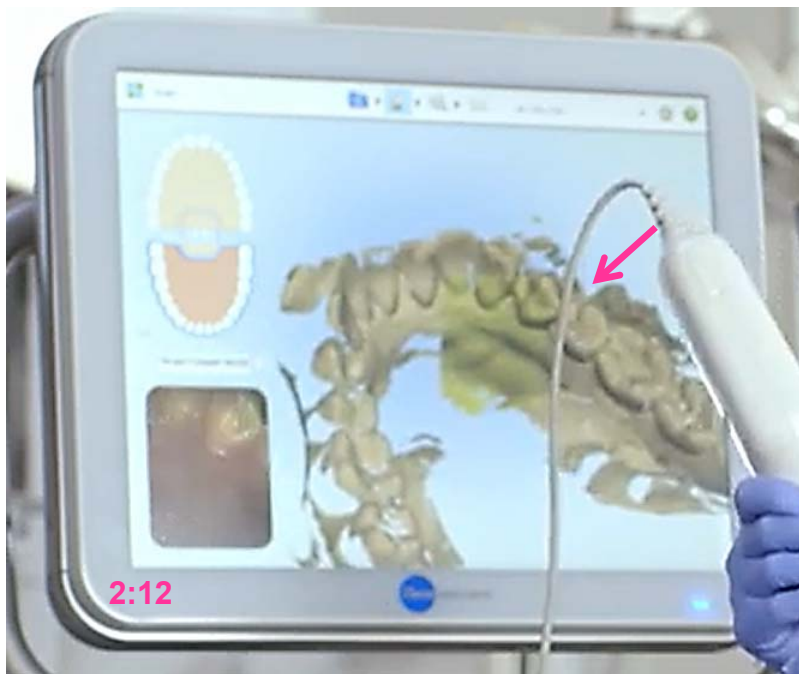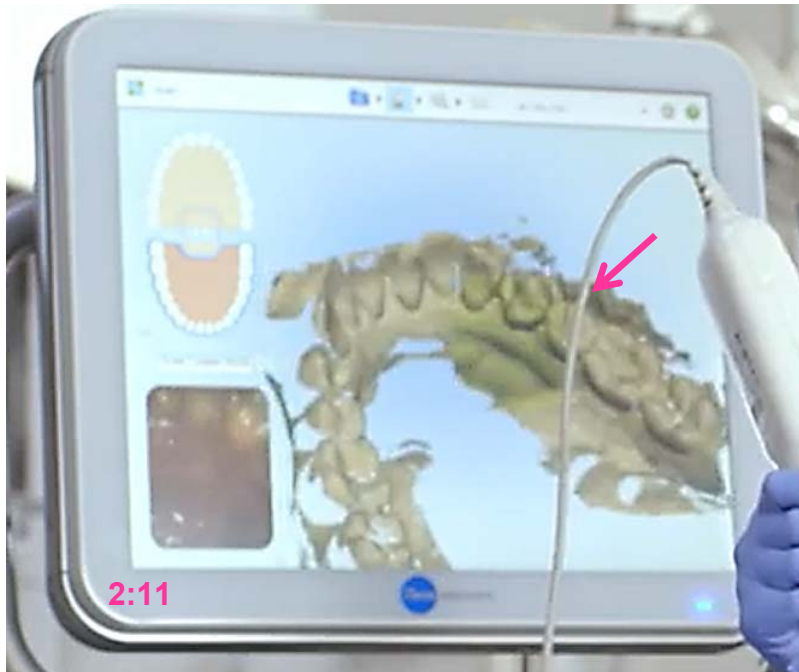

46.   At time 2:03 of Video 1, surfaces associated with the movable object (*i.e.,* lip) are

disregarded in the generation of the virtual 3D model of the patient's mouth as depicted below.
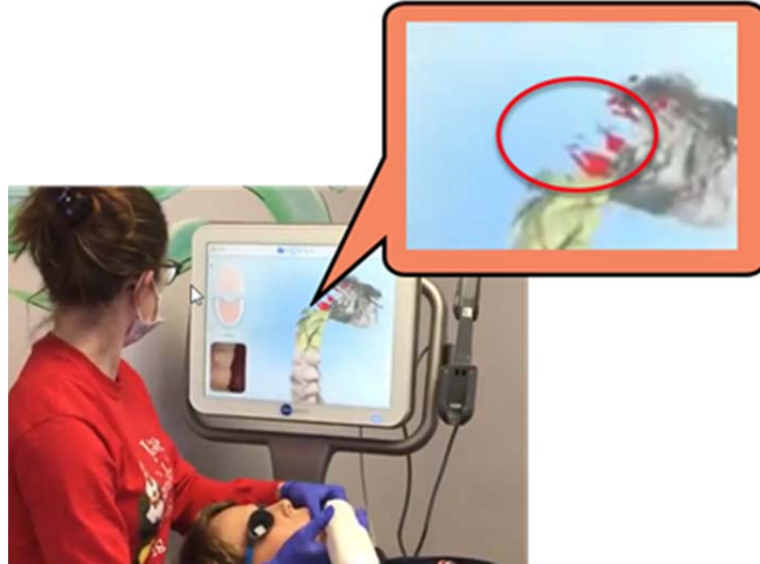
47.   Further, an Align Technology, Inc. Video ("Video 2") found at https://www.youtube.com/watch?v=hDzBjbqD-KI and published on August 14, 2015 (last visited June 3, 2018), attached hereto as Exhibit D, depicts Defendant's Accused Products scanning teeth (*e.g.,* a rigid object) in a location (*e.g.*, patient's mouth) by means of a 3D scanner and generating a virtual 3D model of the rigid object.

48.   As depicted below, at time 2:11 of Video 2, a movable object is detected by Defendant's Accused Products; and at time 2:12 of Video 2, surfaces associated with the movable object are disregarded in the generation of the virtual 3D model of the patient's mouth.

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49.   Further, as depicted below, at time 2:20 of Video 2, a movable object is detected by Defendant's Accused Products; and at time 2:21 of Video 2, surfaces associated with the movable object are disregarded in the generation of the virtual 3D model of the patient's mouth.

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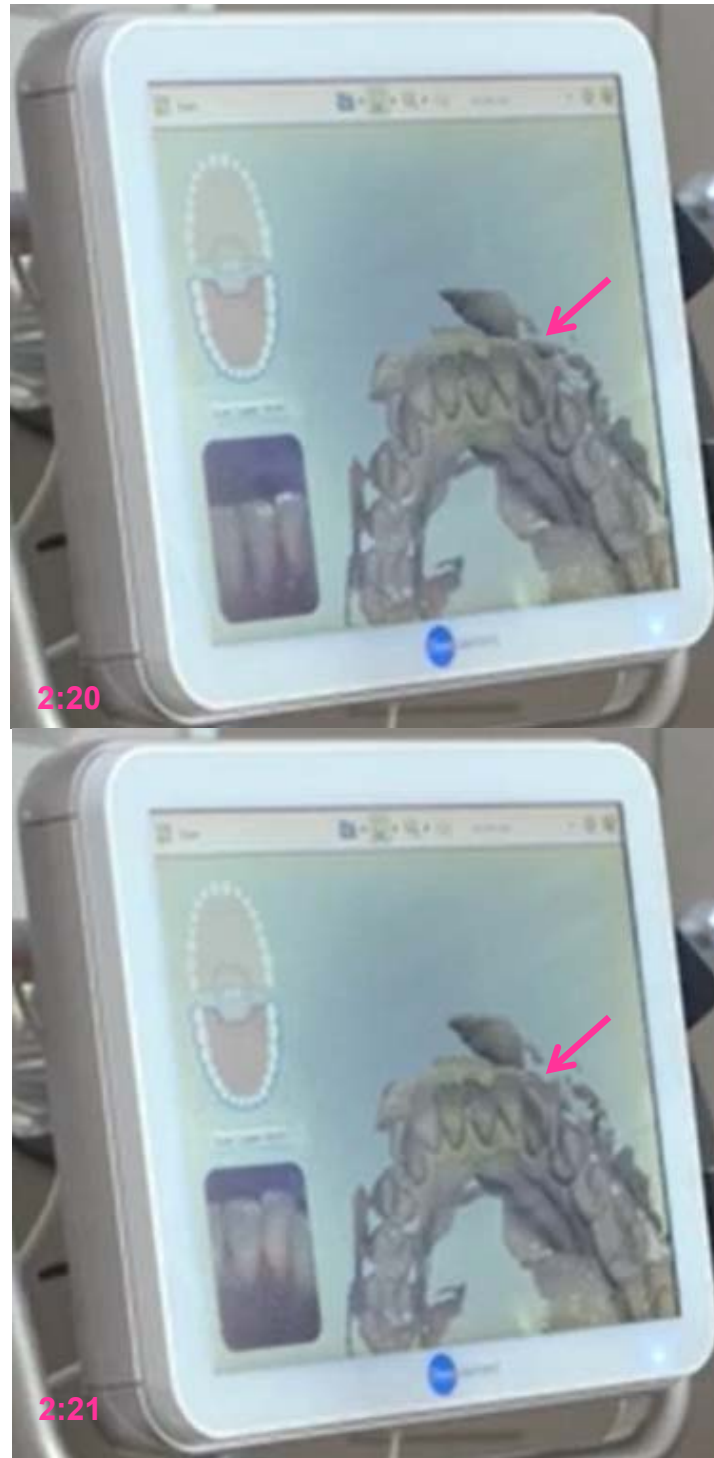
50.   Each of Defendant's Accused Products includes a system comprising a hardware processor configured to: provide a first 3D representation of at least part of a surface by scanning at least part of the location; provide a second 3D representation of at least part of the surface by

scanning at least part of the location; determine for the first 3D representation a first excluded volume in space where no surface can be present in both the first 3D representation and the second 3D representation; determine for the second 3D representation a second excluded volume in space where no surface can be present in both the first 3D representation and the second 3D representation; disregard the portion of the surface in the first 3D representation in the generation of the virtual 3D model, if a portion of the surface in the first 3D representation is located in space in the second excluded volume, and/or disregard the portion of the surface in the second 3D representation in the generation of the virtual 3D model, if a portion of the surface in the second 3D representation is located in space in the first excluded volume.

51.   For example, Defendant's Accused Products include a hardware processor such that "while you are scanning, iTero Element is engineered to simultaneously process the scan. It automatically stitches together images for rendering in the correct order, adapts to changes in positioning, and detects and removes soft tissue." *See, e.g.,* Brochure at 4.

52.   Each of Defendant's Accused Products includes a nontransitory computer readable medium encoded with a computer program product comprising program code for causing a data processing system to detect a movable object in a location, when scanning a rigid object in the location by means of a 3D scanner for generating a virtual 3D model of the rigid object by providing a first 3D representation of at least part of a surface by scanning at least part of the location; providing a second 3D representation of at least part of the surface by scanning at least part of the location; determining for the first 3D representation a first excluded volume in space where no surface can be present in both the first 3D representation and the second 3D representation; determining for the second 3D representation a second excluded volume in space where no surface can be present in both the first 3D representation and the second 3D

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representation; if a portion of the surface in the first 3D representation is located in space in the second excluded volume, the portion of the surface in the first 3D representation is disregarded in the generation of the virtual 3D model; and/or if a portion of the surface in the second 3D representation is located in space in the first excluded volume, the portion of the surface in the second 3D representation the portion of the surface in when said program code is executed on the data processing system.

53.   For example, Defendant's Accused Products include "software [*i.e.,* a computer program product comprising program code that] automatically detects and repositions scanning start and stop points when you move to a new scanning position within the scanned segment." Brochure at 4.

54.   Further, Defendant's Accused Products include a computer program product comprising program code that "automatically stitches together images for rendering in the correct order, adapts to changes in positioning, and detects and removes soft tissue." *Id.*

55.   On information and belief, Defendant's Accused Products rely on a system hard disk, *i.e.,* a nontransitory computer readable medium encoded with the software discussed in paragraphs 53 and 54 to carry out the claimed methods of the '551 patent. Defendant's Accused Products also "automatically save scan data every two seconds and save it to the system's hard disk." *Id.*

56.   These features of each of Defendant's Accused Products in paragraphs 25-55 above correspond to those recited and claimed in at least claims 1, 22, 23, and 25 of the '551 patent.

57.   Defendant has sold and/or offered for sale its iTero Element Scanner in the United States at trade shows in Chicago, IL, New York, NY and Detroit, MI. The "Align Technology

Announces Next Generation iTero(R) Element(TM) Intraoral Scanner" webpage, attached hereto as Exhibit E, is further evidence of Defendant's sale and/or offer for sale of the iTero Element Scanner product in the United States.

58.   Defendant thus directly infringes, literally and/or under the doctrine of equivalents, and/or indirectly infringes, at least claims 1, 22, 23, and 25 of the '551 patent.

59.   On information and belief, Defendant intends to, and continues to intend to, directly infringe the '551 patent through the sale of the Accused Products.

60.   Defendant knew or should have known of the '551 patent and its infringement of the '551 patent, and has acted and continues to act, in an egregious and wanton manner by infringing the '551 patent.

61.   Despite knowing that its actions constituted infringement of the '551 patent and/or despite knowing that there was a high likelihood that its actions constituted infringement of the patent, Defendant nevertheless continued its infringing actions, and continues to make, use, and sell, the Accused Products.

62.   Defendant's acts of infringement have injured and damaged Plaintiff and will continue to injure and damage Plaintiff.

63.   Defendant's actions have caused Plaintiff to suffer irreparable harm resulting from the loss of its lawful patent rights and the loss of its ability to exclude others from the market.

64.   Upon information and belief, Defendant will continue these infringing acts unless enjoined by this court.

COUNT 2: INDIRECT INFRINGEMENT BY INDUCEMENT

65.   Plaintiff repeats and realleges the allegations set forth in paragraphs 1 to 64 above

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as if fully set forth herein.

66.   Defendant is liable for inducing infringement of the '551 patent under 35 U.S.C. §271(b) by having knowledge of the '551 patent and knowingly causing or intending to cause, and continuing to knowingly cause or intend to cause, direct infringement of the '551 patent, with specific intent, by its customers.

67.   Specifically, Defendant actively induces infringement of the '551 patent by, *inter alia*, training its customers on the use of the Accused Products and/or promotion, sales, and/or importation of the Accused Products including the infringing iTero Element Scanners to Defendant's customers including, but not limited to, resellers and end users for their use of the system claimed in the '551 patent.

68.   Defendant's customers for the Accused Products directly infringe the '551 patent by making, using, selling, offering for sale, and/or importing the iTero Element Scanner.

69.   For example, Defendant actively induces infringement of the '551 patent, because Defendant has knowledge that end users of Defendant's iTero Element Scanner including, but not limited to, dentists and technicians, use Defendant's infringing iTero Element Scanner product in the United States, and because Defendant encourages such acts resulting in direct patent infringement, by, *inter alia*, training, promotion, sales, and/or importation of the infringing iTero Element Scanner to Defendant's customers including, but not limited to, resellers and end users for their use of the system claimed in the '551 patent.

70.   On information and belief, Defendant intends to, and continues to intend to, indirectly infringe the '551 patent through inducement of the sale and use of the Accused Products.

71.   Defendant knew or should have known of the '551 patent and has acted, and

continues to act, in an egregious and wanton manner by infringing the '551 patent.

72.   Despite knowing that its actions constituted inducement infringement of the '551 patent and/or despite knowing that there was a high likelihood that its actions constituted inducement infringement of the patent, Defendant nevertheless continued its infringing actions, and continues to make, use, and sell, the Accused Products.

73.   Defendant's acts of infringement have injured and damaged Plaintiff and will continue to injure and damage Plaintiff.

74.   Defendant's actions have caused Plaintiff to suffer irreparable harm resulting from the loss of its lawful patent rights and the loss of its ability to exclude others from the market.   Upon information and belief, Defendant will continue these infringing acts unless enjoined by this court.

COUNT 3:   INDIRECT INFRINGEMENT BY CONTRIBUTORY INFRINGEMENT

75.   Plaintiff repeats and realleges paragraphs 1 to 74 as if fully set forth herein.

76.   Defendant is liable for contributory infringement of the '551 patent under 35 U.S.C §271(c) by having sold or offered to sell, and continuing to sell or offer for sale the iTero Element Scanners within the United States and/or by importing the iTero Element Scanner into the United States because the iTero Element Scanner constitute a material part of the invention embodied in the '551 patent, which Defendant knows to be especially made and/or especially adapted for use in infringement of the '551 patent, and which is not a staple article or commodity of commerce suitable for substantial non-infringing use.

77.   Defendant is liable for contributory infringement by having knowledge of the '551 patent and knowingly causing or intending to cause, and continuing to knowingly cause or intend to cause, direct infringement of the '551 patent by its customers including, but not limited to, resellers and end users of the iTero Element Scanner.

78.   Specifically, Defendant contributes to infringement of the '551 patent by, *inter alia*, promotion, sales, and/or importation of the infringing iTero Element Scanner to Defendant's customers including, but not limited to, resellers and end users for their use of the system claimed in the '551 patent. Those customers directly infringe the '551 patent by making, using, selling, offering for sale, and/or importing the iTero Element Scanner. For example, Defendant is liable for contributory infringement by having knowledge of the '551 patent and knowingly causing or intending to cause, and continuing to knowingly cause or intend to cause, end users of Defendant's iTero Element Scanner including, but not limited to, dentists and technicians, to directly infringe the '551 patent by using Defendant's iTero Element Scanner in the United States.

79.   Defendant's past and ongoing infringement of the '551 patent has and will continue to irreparably harm Plaintiff.

80.   Defendant's past and ongoing infringement of the '551 patent has and will continue to cause Plaintiff damages.

81.   Defendant's past and ongoing infringement of the '551 patent, upon information and belief, has been knowing and willful.

DEMAND FOR JURY TRIAL

Plaintiff demands a trial by jury for all issues so triable.

PRAYER FOR RELIEF

WHEREFORE, Plaintiff respectfully requests that this Court enter:

A.   A judgment in favor of Plaintiff that Defendant has infringed the '551 patent, directly, jointly, and/or indirectly by way of inducing and/or contributing to the infringement of the '551 patent;

B.   An order of this Court permanently enjoining Defendant and its officers, directors, agents, affiliates, employees, divisions, branches, subsidiaries, parents, and all others in active concert therewith from infringing, including inducing the infringement of, or contributing to the infringement of, the '551 patent;

C.   A judgment and order requiring Defendant to pay Plaintiff its damages, costs, expenses, and pre-judgment and post-judgment interest for Defendant's infringement of the '551 patent, as provided under 35 U.S.C. § 284;

D.   A judgment and order requiring Defendant to pay treble damages as provided under 35 U.S.C. § 284;

E.   A judgment and order finding that this is an exceptional case within the meaning of 35 U.S.C. § 285, and awarding to Plaintiff its reasonable attorneys' fees; and

F.   Any and all other relief to which Plaintiff may show itself to be entitled and/or as the Court may deem just and proper.

Dated: June 14, 2018

/s/ Geoffrey G. Grivner

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